Jl S. Afr. Bot. 37 (3): 213–218 (1971)

AN ECOLOGICAL SURVEY OF THE GRASSLANDS OF THE NGOYE FOREST RESERVE, ZULULAND

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ABSTRACT

A brief quantitative account of the grassland of the Ngoye Forest Reserve is given.

UITTREKSEL

'N EKOLOGIESE OORSIG VAN DIE GRASLANDE VAN DIE NGOYE WOUDRESERVAAT, ZULULAND.

'n Beknopte kwantitatiewe verslag van die grasveld van die Ngoye Woudreservaat word aangebied.

INTRODUCTION

The Ngoye Forest Reserve is situated in Bantu Reserve No. 9 in the Mtunzini District of Zululand. A road via the Amanzanyama School makes entrance into the eastern part of the Reserve possible. The western section is almost inaccessible, even for four-wheel-drive vehicles, because of the exceedingly poor condition of the track leading through very rugged terrain via Obanjeni and Engonyameni to this part of the Reserve.

ENVIRONMENTAL FACTORS

The topography, geology, climatic and other physical factors are discussed by Huntley (1965) and are thus omitted from this paper.

THE GRASSLAND

The Reserve is 2 906,3 ha of which approximately 1 000 ha is grassland (Huntley, 1965). About one third of the grassland is found in the eastern part of the Reserve, while a large portion of the remainder covers the western ridges (Fig. 1).

The eastern grassland covers an area of low hills that range in altitude from 200—300 m. The western grassland, extending from 360—450 m in altitude, is found on very rugged terrain of high, steep ridges and deep narrow ravines. The slopes of these ridges are covered by grass, while below the grassland the bottoms of the ravines are clothed in dense forest.

Method of Survey: On a map of the Reserve the grassland areas were

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Accepted for publication on 1st December, 1970.

divided in squares of equal size. Each square was numbered and equally numbered slips of paper drawn from a "hat" indicated the random localities of the survey,

The wheel-point method of survey (Tidmarsh & Havenga, 1955) was used. A total of 1 500 points was made in each of the grassland areas. The survey, which took place in March, was carried out to determine the floristic composition and basal cover of the grasslands of the Reserve.

Instead of the double-wheel, steel apparatus used by Tidmarsh & Havenga (1955) a single-wheel apparatus of aluminium, developed by the late von Broembsen of the Institute for Botanical Research, Pretoria, was used. The von Broembsen apparatus is much lighter, smaller to transport and easier to handle in rugged terrain.

The criteria for strikes and misses defined by Tidmarsh & Havenga (1955) were applied.

The results of this survey are listed in Tables 1 and 2.

DISCUSSION

The Eastern Grassland. This area has a total basal cover of 35,49 percent (Table 1), which is high but normal for a region of high rainfall (Killick, 1963; Venter, 1969; & West, 1951).

Paspalum commersonii and *Hyparrhenia filipendula* are the two dominants, with true basal covers of respectively 5,86 and 5,06 percent (Table 1). Their relative basal covers are respectively 16,5 and 14,3 percent (Table 1). The subdominant species are *Tristachya hispida*, *Setaria sphacelata*, *Centella coriacea*, *Eragrostis capensis*, *Bulbostylis contecta*, *Digitaria macroglossa* and *Sporobolus centrifugus* of which the true basal covers vary from 1,86 to 3,53 percent (Table 1). It is of interest to note that *Centella coriacea*, a forb, attains such an important position in this grassland.

It was observed during various visits to the Reserve that *Lasiosiphon splendens*, *Arthrosolen calcephalus*, *Helichrysum adscendens*, *H. appendiculatum*, *Aspilia natalensis* and *Pseudarthria hookeri* are typical aspect dominants when in full bloom.

The Western Grassland. The total basal cover amounts to 28,43 percent (Table 2).

Aristida junciformis is completely dominant with a basal cover of 12,26 percent and relative basal cover of 43,1 percent (Table 2). The three subdominants, *Paspalum commersonii*, *Eragrostis capensis* and *Hyparrhenia filipendula* have much lower true basal cover values of respectively 3,20, 3,00 and 2,86 percent. The majority of the species struck, have basal values of less than 1 percent.

A typical aspect dominant on burnt patches is *Senecio latifolius*.

The grassland form of *Stangeria eriopus* is common in this area and seems to be unaffected by the frequent fires that occur in this grassland.

From the survey of the two areas it becomes evident that the vegetation of the eastern grassland has more valuable grazing grasses present as dominants, with a true basal cover of 7,06 percent higher than that of the western grassland. *Aristida junciformis*, the western dominant species, has no grazing value except in the very young stage and hence the frequent burning of the *Aristida* grassveld to provide new grazing. *A. junciformis* has a relative basal cover of 0,4 percent in the eastern grassland (Table 1) compared to 43,1 percent relative cover value in the western grassland (Table 2).

There is a considerable decrease in the number of grass species from the eastern to the western area. A total of 21 species were recorded in the eastern grassland, against 13 species in the western grassland (Tables 1 & 2). Veldmismanagement is most probably the cause of this disappearance of less hardy species of grass.

The Leguminosae reveals a decrease similar to that of the Gramineae.

A comparison of these grasslands of the Ngoye Forest Reserve with the surrounding grasslands reveals the following:

i) The western grassland resembles the grassland of the surrounding Bantu Reserve to a high degree. In both areas *Aristida junciformis* is the exclusive dominant species with high cover values. Venter, (1969) e.g. found basal cover values ranging from 6,9 to 15,1 percent for *A. junciformis* in typical mismanaged grassveld, comparable to the 12,26 percent of the western grassland.

ii) The eastern grassland has dominants which one never finds as dominants in the surrounding Bantu Reserves. These species are, however, important and conspicuous in protected areas such as the Enseleni Nature Garden near Empangeni.

iii) According to Bayer (1938) *Themeda triandra* should be a dominant in the Zululand grasslands. This dominance is clearly demonstrated in the Enseleni Nature Garden where under protection *T. triandra* completely dominates the grassland. The low cover values of this species in the Ngoye Forest Reserve, 0,66 and 0,06 percent (Tables 1 & 2) in the eastern and western parts respectively, suggests that even the eastern grassland is not of the Zululand climax grassland type.

CONCLUSION

The above survey and comparisons suggest that the grassland of the Ngoye Forest Reserve is in need of proper protection, especially against fires which so frequently spread into the Reserve from the surrounding areas.

TABLE 1

Wheel-point Survey of the *Paspalum/Hyparrhenia* Community
(Summary of the results of 1 500 points)

	True* basal cover	Relative† basal cover
	percentage	
Paspalum commersonii	5·86	16·5
Hyparrhenia filipendula	5·06	14·3
Tristachya hispida	3·53	9·9
Setaria sphacelata	3·06	8·6
Centella coriacea	2·66	7·5
Eragrostis capensis	2·20	6·2
Bulbostylis contecta	2·20	6·2
Digitaria macroglossa	2·13	6·0
Sporobolus centrifugus	1·86	5·2
Trachypogon spicatus	1·00	2·8
Themeda triandra	0·66	1·9
Cyperus obtusiflorus	0·66	1·9
Sporobolus africanus	0·60	1·7
Eulalia villosa	0·60	1·7
Paspalum distichum	0·40	1·1
Coelorhachis capensis	0·33	0·9
Aristea cognata	0·26	0·7
Hyparrhenia cymbaria	0·26	0·7
Scleria melanomphala	0·26	0·7
Desmodium hirtum	0·20	0·6
Eragrostis curvula	0·20	0·6
Argyrolobium rupestre	0·13	0·4
Zornia capensis	0·13	0·4
Hypoxis argentea	0·13	0·4
Aristida junciformis	0·13	0·4
Andropogon shirensis	0·06	0·2
Berkheya setifera	0·06	0·2
Brachiaria brizantha	0·06	0·2
Cassia mimosoides	0·06	0·2
Commelina africana	0·06	0·2
Elyonurus argenteus	0·06	0·2
Panicum maximum	0·06	0·2
Pycreus ferrugineus	0·06	0·2
Stenotaphrum secundatum	0·06	0·2
Syncolostemon argenteus	0·06	0·2
Tephrosia longipes	0·06	0·2
Thesium natalense	0·06	0·2
Unidentified	0·26	0·7
Total	35·49	100·4

* *True basal cover*—Total number of points at which a species was recorded as a percentage of the total number of points made.

† *Relative basal cover*—Total basal cover of one species as a percentage of the total basal cover of all species.

TABLE 2
Wheel-point Survey of the *Aristida/Paspalum* Community
(Summary of the results of 1 500 points)

	True basal cover	Relative basal cover
	percentage	
Aristida junciformis	12·26	43·1
Paspalum commersonii	3·20	11·3
Eragrostis capensis	3·00	10·6
Hyparrhenia filipendula	2·86	10·1
Djigitaria macroglossa	1·66	5·8
Cyperus obtusiflorus	1·60	5·6
Bulbostylis contecta	1·46	5·1
Sporobolus africanus	0·66	2·3
Trachypogon spicatus	0·46	1·6
Tristachya hispida	0·26	0·9
Eulalia villosa	0·13	0·5
Eragrostis curvula	0·13	0·5
Hypoxis argentea	0·13	0·5
Brachiaria humidicola	0·06	0·2
Themeda triandra	0·06	0·2
Sporobolus pyramidalis	0·06	0·2
Senecio erubescens	0·06	0·2
Centella coriacea	0·06	0·2
Aristea cognata	0·06	0·2
Unidentified	0·26	0·9
Total	28·43	100·0

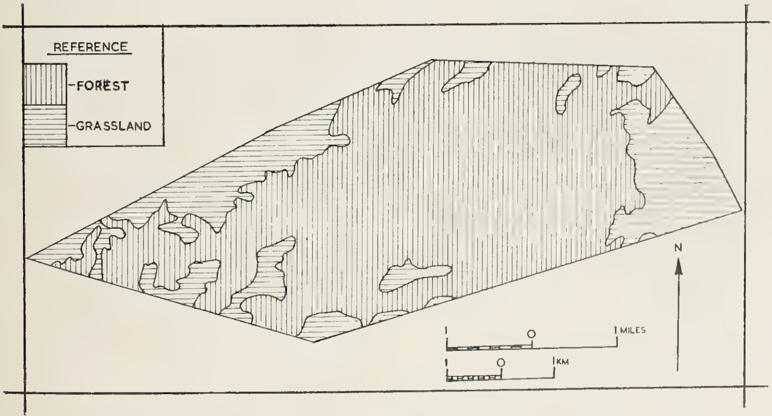

FIG. 1.
Map of the Ngoye Forest Reserve.
(After South Africa 1:50 000 Sheet 2831CC Blackburn)

ACKNOWLEDGMENTS

My sincere thanks to: i) Prof. A. W. Bayer, University of Natal, for his valuable comments on this paper.

ii) Mr. J. P. Mtombeni, University of Zululand, for his assistance with the quantitative survey.

iii) The staff of the National Herbarium, Pretoria, for naming the specimens collected in the Ngoye Forest Reserve.

iv) Dr. K. Gordon-Gray, University of Natal, for naming the Cyperaceae specimens.

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